

Engineers Train With New, Advanced Equipment



The lightweight mobile obstacle breacher will clear a path 250 feet long and 18 inches wide.

By Private First Class Matthew J. Jenkins

During the recent Digital Mountain Peak exercise at Fort Drum, New York, sappers from A Company, 41st Engineer Battalion, 10th Mountain Division, trained with new equipment designed to increase the survivability and agility of the division. The training was in preparation for the Joint Contingency Force Army Warfighting Experiment that the 10th Mountain Division participated in at the Joint Readiness Training Center, Fort Polk, Louisiana, from 9 to 21 September 2000. Combat engineers are an integral part of the combined-arms team, and this new equipment will allow brigade engineers (engineer company commanders) to respond quicker to the brigade task-force commander's intent on the battlefield.

Lightweight Mobile Obstacle Breacher

To clear a path through a suspected minefield more quickly, light engineers now can turn to the lightweight mobile obstacle breacher (LMOB). The 55-pound, manpackable device is designed to eliminate surface-laid or buried antipersonnel mines. The LMOB contains a 250-foot, rocket-propelled detonation cord; a 30-foot spool of wire that attaches to the detonator; and a stake that secures the case to the ground.

The detonation cord contains 1,000 grains of explosive substance per foot, which will clear a 250-foot-long, 18-inch-wide path through an antipersonnel minefield. This is 20 times stronger than the old 50-grain-per-foot detonation cord. Attached to the front end of the detonation cord are two twisted metal cables about 3 feet long. These lightweight cables, which are attached to both sides of the rocket base, allow the rocket to successfully deploy without tearing away from the detonation cord. The LMOB, which comes with two reloads per kit, eventually will be employed by infantrymen if sappers are not readily available.

Mini-Mine Detector

One of the new tools that will increase the survivability of light fighters is the mini-mine detector (MIMID), which is about half the weight

and one-fourth the size of the older conventional mine detector (the AN/PSS-12). A soldier can comfortably crawl on the ground with this new device to elude enemy fire. The small, collapsible frame of the MIMID makes it ideal for light engineers or light fighters to have readily accessible. Unfolding up to 4 feet in length, the 6-pound MIMID is powered by four AA batteries that are located in the handle.

To use the MIMID, a soldier sticks one hand through a hollow, rectangular frame and grips a handle located directly behind the top of the electronics control unit (ECU). The top of the frame rests against the bottom of the wrist to provide stability. A soldier can probe a 1-meter area 180 degrees in front of him with the MIMID's hollow, rectangular search head.

The ECU is the brains of the MIMID. There is a light-emitting diode (LED) on top of the ECU and an earpiece connection on the right side. A pair of knobs at the bottom of the ECU allows an operator to control the volume of the earpiece and the sensitivity of the search head. The ECU of the older mine detector was separate from the probing device.

The LED allows light fighters to tell if they are "hot" or "cold" when it comes to mine detection. The flashing red, six-level meter goes from top to bottom to inform a soldier of the presence of a metallic object. Then a "probe man" determines if the metallic object is a mine. If it is, a demolition team comes along and destroys the mine.

Volcano (Light)

In addition to new devices for defeating the enemy's land mines, light engineers are training with a new tool that will allow them to lay mines of their own. The Volcano (Light) is designed to lay a minefield about 900 feet long and more than 110 feet wide. Attached to the back of a high-mobility, multipurpose, wheeled vehicle (HMMWV), it allows more mobility than the larger Volcano, which is attached to a 5-ton truck.

The Volcano (Light), which is operated from where the back seat would normally be in a HMMWV, sits about 18 inches off the vehicle's floorboard on a stand that rotates 180 degrees. The Volcano (Light) has twenty 2-foot-long metal canisters, each containing five antitank mines and one antipersonnel mine. The canisters are braced by an inclined strip of metal. Once the canisters are armed, pressing a button expels the mines over the perimeter. When the mines hit the ground, trip wires spring out of each mine to prevent the enemy from passing safely.

M-Gator

Conserving soldiers' energy on today's up-tempo battlefield is always an issue, and a new device unveiled during Digital Mountain Peak helps conserve that energy. The newly modeled M-Gator is basically a military golf cart. It's a six-wheeled, topless vehicle that is able to travel through all types of terrain. About 3 feet tall, it is much more mobile than a HMMWV.



The Volcano (Light), scaled down to fit a HMMWV to match the mobility of a light fighter, creates a defensive minefield.

The two-seated vehicle can haul up to 1,400 pounds of equipment in two cargo trays. The smaller equipment tray on the hood holds about 2 cubic feet in volume, and the rear tray holds about 14 cubic feet. The 18-horsepower M-Gator, which runs on diesel fuel and can reach a speed of 17 miles per hour, can be sling-loaded by a UH-60 Black Hawk helicopter. The M-Gator can be used for evacuating casualties, laying communication lines, and transporting messages.

Skid Steer

In addition to helping clear obstacles, a new initiative—the skid steer—will also help light engineers construct some obstacles and field fortifications of their own (see *Engineer*, February 1998, page 18). The highly maneuverable skid steer, which resembles the combination of a small bulldozer and a small forklift, increases combat-engineer-squad capabilities and reduces physical fatigue. Two versions of the skid steer—both camouflage-painted and commercially available—are being evaluated. The Melroe Bobcat® Model 763 (see front cover) is a rubber-tired vehicle but, when needed, steel tracks can be manually installed over the tires to increase mobility. The Caterpillar® ASV Model MD-2810 has full-time rubber tracks for propulsion, which gives a reduced psi rating for traveling over wet and swampy terrain. Seven different attachments can be installed on either skid steer:

- Picket pounder—installs concertina wire, pickets, and post.
- Clamshell bucket—excavates or drops material in a designated spot. It is used for paving projects, such as filling in potholes.
- Auger (12-, 24- or 36-inch)—drills holes. One practical use for the 24- and 36-inch augers is to drill side-by-side holes up to 5 feet deep.
- Backhoe—excavates sand or gravel.
- Pavement breaker—breaks down pavement, concrete, or asphalt obstacles.
- Closed bucket—transports excavated materials.
- Fork lift—moves palletized equipment.

High-Mobility Engineer Excavator

The new high-mobility engineer excavator (HMEE) will phase out the older small emplacement excavator (SEE). The HMEE will provide better mobility, greater reliability, and a larger front-end loader than the SEE. The HMEE can reach a speed of 70 mph, as opposed to the SEE's top speed of 30 mph. The HMEE's front-end loader can be used for limited bulldozing. A backhoe attachment can excavate up to 14 cubic feet of dirt or gravel per scoop, 7 cubic feet more than the SEE. When the backhoe is not in use, it folds up, turns sideways, and leans in toward the HMEE's cab. The HMEE will be helpful to all soldiers on the battlefield, whether they need to dig a fighting position in a few seconds or construct a large berm to serve as a barrier from the enemy.

Robotic T-3 Dozer

Light engineers also will be using some new technological initiatives to tackle obstacles during military operations in urban terrain (MOUT). They can stay out of harm's way while clearing obstacles, thanks to the new Robotic T-3 Dozer, which is designed to clear away rubble and debris that obstructs the path of light fighters in MOUT settings. The diesel-fuel-operated dozer is about 12 feet long and 9 feet tall. Propelled by steel tracks, it weighs between 4 and 5 tons and has a top speed of about 10 mph. The remotely controlled bulldozer can be operated from up to 1,000 feet away. A camera placed on the ceiling of the dozer's cab projects onto a television screen and allows the operator to see as if he were sitting in the cab.

Urban Robot

Light engineers also trained with a new robotic reconnaissance tool that is small enough to recon sewers and tunnels in a MOUT setting. The urban robot (URBOT)—which has a camera on its front, rear, and top—can be operated from up to 1,000 feet away. A lithium battery powers the unit for up to 2 hours.

The black aluminum URBOT is a 65-pound, manpackable initiative that is about 2 feet long and 1 foot wide. It is rubber-tracked, can travel about 3 feet per second, and can climb stairs. The URBOT is a unique two-way reconnaissance device: the operator can speak through the device and also hear sounds. The URBOT can be guided to approach a person, shine a light



The HMEE is faster and more reliable and will do double the work of the SEE.

in his face, and speak directly to him to identify him as friend or foe. Another use the 41st Engineer Battalion found for the URBOT was to guide it under a HMMWV to find an oil leak with the robot's lighted camera.

Topographic Systems

In addition to those forms of reconnaissance, light engineers can also provide topographic maps to brigade task-force commanders. A three-part system for collecting topographic information will allow terrain detachments to disseminate information much faster. The system collects data from satellites orbiting the earth, sends it to a compact disc, prints it, and puts it into squad leaders' hands.

The first new initiative accessed in this chain of events is the Rapid Terrain Data Generation (RTDG) System. This set of compact discs contains data collected from aerial reconnaissance devices. Satellite dishes that orbit the earth and airplanes feed the computer data about terrain features. The technology on the compact disks turns the data into a high-resolution topographic map.

After the data is sent from the RTDG System, it hits the second new initiative on this information highway, the Digital Topographic Support System-Light (DTSS-L). The DTSS-L is mounted inside a shelter on the back of a HMMWV. In addition to the regular devices of a HMMWV, the DTSS-L has some

commercial-off-the-shelf (COTS) technology—such as printers, scanners, and a computer workstation—to help topographers process the geographic data. Through a computer network link, the information goes to a third new initiative, the Rapid Hardcopy Reproduction (RHR) System. The RHR System has the capability to print up to 5,000 color maps a day. Because they are connected by a computer network, RHR Systems can be set up in many places on the battlefield. This will allow information to be distributed to a large group of people in a small amount of time. The brigade's tactical-operations center will be able to disseminate the topographic information all the way down to the squad leaders.

Conclusion

The 41st Engineer Battalion wants to build on these emerging technologies to increase the unit's versatility and mobility on the modern battlefield. With this new equipment, the battalion will be better prepared to maximize combat-engineer support to the division across a full spectrum of operations.



(All photographs by Private First Class Matthew J. Jenkins.)

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The Engineer Writer's Guide

We think engineers take a special pride in their profession, and *Engineer* is always looking for articles from readers who want to share their expertise, experience, and ideas.

If you are a potential contributing writer, here are a few "writer's guide" tips to steer you in the right direction.

Articles may discuss engineer training, operations, doctrine, equipment, history, or other areas of general interest to an engineer readership.

We're especially interested in articles that have a "how-to-do-it-better" theme. For instance, we're not looking for articles telling readers how you conducted a routine field exercise. But if you think you have a "new-and-improved" way of conducting a tactical operation, training exercise, or other operational procedure that may prove helpful to other engineers, that's what we need.

Articles should generally come from contributors with firsthand experience of the subject being presented. Articles should be concise, straightforward, and in the active voice.

Length should range from 2,000 to 4,000 words, and text should be double-spaced. Generally, each such page should contain from 200 to 250 words. Manuscripts should be originals or clear copies. Provide a 3 1/2-inch disk in Microsoft Word, Rich Text Format, or ASCII (please indicate word-processing format on disk or cover letter). You also may send articles by e-mail to bridgess@wood.army.mil.

Articles containing attributable information or quotations not referenced in the story should carry appropriate endnotes.

Contributors are encouraged to include black-and-white or color photos, artwork, and/or line diagrams that illustrate information in the article. Include captions for any photographs submitted. Hard-copy photos are preferred, but we will accept digital images originally saved at a resolution no lower than 200 dpi. Please do not include them in the text. If you use PowerPoint, save each illustration as a separate file and avoid excessive use of color and shading. Please do not send photos embedded in PowerPoint.

Include your full name, rank, current unit, and job title. Also include a list of your past assignments, experience, and education; your mailing address; and a fax number and commercial daytime phone number.

Reviews of books on engineer topics are also welcome.

Articles or book reviews may be mailed to: Editor, Engineer Professional Bulletin, 320 Engineer Loop, Suite 210, Fort Leonard Wood, Missouri 65473-8929.

All submissions are subject to editing.

If you have questions about an article you're working on—or considering writing—call Shirley Bridges, at DSN 676-5266, or commercial (573) 596-0131 ext. 35266. We look forward to hearing from you.

Note: Due to the limited space per issue, we will not print articles that have been accepted for publication by other Army professional bulletins.